

**BUREAU OF HIGHWAYS
REQUEST FOR PROPOSAL
for
QUALIFICATIONS BASED SELECTION FOR PREQUALIFIED SERVICES**

The Michigan Department of Transportation (MDOT) is seeking professional services for the project contained in the attached scope of services.

If your firm is currently prequalified for this type of work and you are interested in providing services, please indicate your interest by submitting a Proposal. The Proposal must be submitted in accordance with the latest "Vendor Selection Guidelines for Service Contracts", available on the MDOT website.

For efficiency sake, we are asking that the vendor firm provide **3** paper copies of the Proposal to the MDOT Survey Project Manager named in the attached scope of services.

These copies must be received by **3:00 pm on Monday, November 8, 2005**. Fax and electronic copies are not acceptable. Send them to:

Thomas W. Benson, Survey Consultant Project Manager
Michigan Department of Transportation
Van Wagoner Building
425 W. Ottawa Street, B220
P.O. Box 30050
Lansing, MI 48909

In addition, provide one unbound copy to:

Regular Mail:
Secretary, **Operations Contract Support**
Michigan Department of Transportation
P.O. Box 30050
Lansing, MI 48909

OR

Overnight Mail:
Secretary, **Operations Contract Support**
Michigan Department of Transportation
425 W. Ottawa
Lansing, MI 48933

This copy is to be received within three working days after the due date and time specified above. Please do not deliver in person.

Any questions relative to the scope of services must be submitted by e-mail to the MDOT Survey Project Manager. Any questions must be asked at least three working days prior to the due date and time specified above. All questions and their answers will be placed on the MDOT website as soon as possible after receipt of the questions. The names of vendors submitting questions will not be disclosed.

For a cost plus fixed fee contract, the selected vendor must have a cost accounting system to support a cost plus fixed fee contract. This type of system has a job-order cost accounting system for the recording and accumulation of costs incurred under its contracts. Each project is assigned a job number so that costs may be segregated and accumulated in the vendor's job-order accounting system.

The selection team will review the information submitted and will select the firm considered most qualified to perform the engineering services based on the proposals. The selected vendor will be contacted to confirm capacity. Upon confirmation, that firm will be asked to prepare a priced proposal. Negotiations will be conducted with the firm selected.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

The scope of services is attached to this solicitation.

As part of this solicitation the DBE goal is waived.

This project will be classified to be between \$100,000 and \$500,000 according to Exhibit F.

For the purposes of this RFP, the following categories of Exhibit F are required as part of the scoring process (Exhibit C) to select a vendor as contained in the "Vendor Selection Guidelines document. This change will increase the total number of pages up to a maximum of 8 per Exhibit F plus Resume and Capacity pages.

- 1.) Understanding of Services and Technical Proposal – 3 pages
Be specific on timeframes, methods, sequences and personnel whose resumes are included. A Gantt Chart is suggested.
- 2.a.) Organization Chart – 0.5 pages
Keep in mind that no engineering is required for this project.
- 2.b.) Structure of Team – 0.5 pages
List what offices team members are from.
- 3.) Resumes – 1 to 2 pages per employee per Project Team member - show project related experience only.
 - a.) Qualifications of Team Leader – The team leader is defined as the person in charge of

- the project. For survey projects this person is a Professional Surveyor as defined by Act 299 and will be the primary MDOT contact. Only list projects that relate to this prequalification category.
- b.) Qualifications of Remaining Key Staff and Sub-consultant Staff – 1 to 2 pages – list up to 5 related projects only. Resumes are required for all personnel depicted on the Organizational Chart (ie: QA/QC, CADD, Crew Chiefs, Survey Techs, Office, etc.). Construction staking is not a similar project.
 - c.) A note of caution, we realize we are asking for team member information for a project that will start up to several months in the future. All firms are asked to submit this information for which this scoring will be based. For a fair process, key personnel will not be allowed to be changed without submitting a resume for those personnel to insure a comparable background. **Payment invoices will be compared to the approved organizational chart, if differences are noted the payment process may be slowed, stopped, or the amount reduced.**
- 4.) References / Past Performance – 1 page
Projects listed should relate to the pre-qualification category being advertised in this RFP. References will be checked. Construction staking does not qualify.
 - 5.) Capacity – 1 page per employee per Project Team member
Include all team members and all projects, whether for MDOT or the Private sector and the anticipated completion date.
 - 6.) Quality Assurance / Quality Control Plan – 1 page
Plan should be survey not engineering based.
 - 7.) Location – 0.5 pages
If multiple offices are involved this will be scored based on the location of the Team Leader.
 - 8.) Safety – 1 page – Be project specific.

Any items that are omitted or conflict in documentation will result in the immediate disqualification of the proposal and it will be returned with a letter stating why.

Please note that three (3) proposals are required to be submitted to the Survey Project Manager.

I-69 from M-15 to M-24 Genesee County & Lapeer County

SURVEY SCOPE OF WORK

This project will be performed in International Feet.

DATE: October 24, 2005

PROJECT ROUTE : I-69 from M-15 to M-24, Genesee County & Lapeer County

CONTROL SECTION : 25084 & 44043

JOB NUMBER : 79776 C

PROJECT LIMITS : I-69 from the M-15 interchange thence East to the West side of the Morris Road Overpass on I-69, Genesee County & Lapeer County

MAPPING LIMITS : I-69 from M-15 to the West side of the Morris Road Overpass on I-69, Genesee County & Lapeer County, Full Topographic and Terrain mapping is required from Right-of-Way to Right-of-Way (see mapping section for specific details).

Please see all sections of this scope for more specific details.

Submit a Proposal based upon the requirements of the Request for Proposal and this Scope.

MDOT TEAM

Any survey related questions over this project may be directed to the Survey Project Manager, Thomas W. Benson, at phone (517) 373-0020.

Any road design related questions over this project may be directed to the Project Manager / Road Design Engineer, Kenneth Thorp, at phone (810) 653-7470.

GENERAL REQUIREMENTS :

1. Surveys must meet all requirements of the Michigan Department of Transportation (MDOT) Standards of Practice dated April 1, 1998. Please contact our office to clarify any specific questions regarding these standards.
2. Consultants must obtain all necessary permits, including an up-to-date permit from the MDOT Utilities Coordination and Permits Section, required to perform this survey on any public and/or private property.

- Survey Notes for:

10. Each portfolio is to be divided into six sections. These sections are to be labeled as follows: **Administrative, Alignment, Control, Property, Mapping, and Miscellaneous.**

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- b. The **Alignment** section will contain a sketch of the alignment, witnesses and stationing of alignment points set or found; an explanation of how the **legal or best fit alignment** was determined, and all supporting documentation.
 - c. The **Control** section contains the data collected and copies of all research documents used to establish the **horizontal and vertical** reference systems for the project (ie: OPUS and post processing output), and includes a thorough written explanation describing how the systems were established. This section should also contain a complete list of control coordinates, control traverse raw data, least squares analysis for both traverse and benchmarks, a separate listing of control points to include **coordinates and witnesses, station and offset, and scale factor if grid coordinates are listed** for mapping and construction staking of the project. A complete benchmark list with datum, station and offset, elevation, and description of each benchmark shall also be included. This information must be submitted in hardcopy and ASCII electronic file format per Attachment ASC on CD-ROMs. Also, a sketch of the control traverse, showing any ties (government corners, property, alignment, etc.) shall be included in this section.
 - d. The **Property** section contains all information that is utilized regarding the real property affected by the project, and all necessary property ties. This may include copies of all **recorded** land corner recordation certificates for the government corners used, reestablished, or in danger of obliteration by impending road construction; recorded plats, recorded certified surveys, tax maps, tax descriptions, and adjacent/riparian owners.
 - e. The **Mapping** section contains all survey notes, research documents, and collected data used to plot the maps necessary for this project. All plots and CD-ROMs for topography are to be placed in this section, as well as utilities and drainage information.
 - f. The **Miscellaneous** section contains any information not included in the previous sections. The surveyors project report should specify any items included in this section.
11. A portfolio may contain several types of data, but no section is to contain more than a single type. For example, a Bridge survey must be packaged separately from a Road survey. **All sheets in a portfolio must be marked with the control section, job number, section number and page number and relate to the Table of Contents. CD-ROMs must be labeled with the control section, job number, data type and file names and should be setup to match the portfolio (6 subdirectories per item 10).**
12. The following information is to be submitted on CD-ROM:

- a. Text files, in ASCII format per Attachment ASC, containing the witness lists for the horizontal alignment ties, horizontal control points, bench marks, and government corners **as well as a DGN containing this data.**
 - b. Any other text files are to be in ASCII Text Format only.
13. Documents are to be submitted as follows:
- a. All recorded instruments on 8.5" x 11" sheets.
 - b. All text files printed on 8.5" x 11" sheets.
 - c. All recorded plats and condominiums on 18" x 24" sheets.
 - d. All plots on 24" x 36" sheets.
 - e. All documents and plots are to be legibly printed or reproduced on white paper.
14. The Consultant representative shall record and submit type-written minutes for all project related meetings to the MDOT Project Manager within two weeks of the meeting. The Consultant shall also distribute the minutes to all meeting attendees.
15. The MDOT Project Manager will be the official contact for the Consultant. The Consultant must either address, or send a copy of all correspondence to the MDOT Project Manager. The MDOT Project Manager shall be made aware of all communications regarding this project.
- 16. All data, whether electronic or paper must be recorded on non-rewritable Compact Discs (CDs). All paper pages / files, including MicroStation files, contained in the portfolio are required to be scanned and / or converted to Adobe Acrobat PDF (portable document format) format and placed in the appropriate subdirectory on the CD. The Table of Contents (PDF format) will have all PDF pages for the project book marked / linked so that each section or page on the CD can be accessed with a single computer mouse click. All original specified electronic files, such as Ascii text, Caice, Microstation DGN, etc. must be accessible in their original format. All photos must be in JPEG format.**
- 17. CDs must be labeled with the route, location, control section, job number, Consultant name, and data type.**
18. Be sure to check our web page for the latest updated material / files.

Any questions regarding to this project should be directed to Thomas W. Benson, Design Survey Consultant Coordinator, at 517-373-0020 (direct + voice mail) or e-mail at

bensont2@michigan.gov.

At the completion of this survey, all field survey notes, all electronic data, and all research records obtained for this project will be considered the property of MDOT and must be sent to the MDOT, Design Division, Survey Project Manager at the following address:

Thomas W. Benson, Survey Consultant Project Manager
Michigan Department of Transportation
Van Wagoner Building
425 W. Ottawa Street, B220
P.O. Box 30050
Lansing, MI 48909

Please use MDOTs Form 222(5/01) entitled SURVEY NOTES: RECEIPT AND TRANSMITTAL for all transmittals.

It is required that the projects survey control be submitted for review as soon as it is available.

WORK RESTRICTIONS

The selected consultant survey firm must have the Professional Surveyor in charge of the project contact the Traffic and Safety Engineer at the Davison TSC, who has jurisdiction over the project location, to determine what work restrictions will be imposed and which maintaining traffic scenarios will be acceptable.

PROJECT SCHEDULE

The anticipated start date is January 2, 2006 with the scheduled survey completion date for the Topography / Terrain (Road Design) Survey being June 23, 2006.

MILESTONE PAYMENT SCHEDULE

Compensation for this Scope of Design Services shall be on a Cost Plus basis. Such Cost Plus compensation shall be paid on a monthly basis for the following portions of the services and in the following amounts with the total not to exceed the total negotiated price for the contract:

1. Road Design Survey, PPMS Task 3330	100%
Total Reimbursement for services	100%

FIELD SURVEY

The purpose of the field survey is to obtain all information and/or data required by the project

design engineer, to leave control in the field for future construction staking, and to provide a sufficient history of the area to enable the MDOT Design Survey Unit to perform, in the future, dependable surveys.

The field survey must include, but is not limited to, the following:

CONTROL

Horizontal and Vertical Control Point lists for a previous MDOT project that ended at M-15 and the Vertical Control Point list for an MDOT project along M-24 will be supplied to the selected Survey Consultant.

The methods used to establish the horizontal and vertical components of the project coordinate control system must be fully discussed in the Surveyor's Project Report.

HORIZONTAL

The horizontal project control for this project will be classified as intermediate project control according to the MDOT Standards of Practice dated April 1, 1998. These points are intended for mapping and should be located outside the proposed construction area to insure their availability for all phases of construction. Each control point must be accurately described and witnessed to at least three nearby features. Please refer to MDOT's Standards of Practice for the minimum requirements for these points.

A closed traverse must be run and adjusted between two or more known points on the project control traverse. Open traverses are **NOT** acceptable. Unadjusted traverse measurements must produce an error of closure of not greater than 1:20,000. Any permissible error of closure shall be distributed throughout the traverse by means of a suitable least squares adjustment software program. These points must not be set greater than 1200 feet or less than 490 feet apart, semi-permanent in nature, and located outside the proposed construction area to insure their availability for all phases of construction. All data collection traverse points and the plan centerline alignment must be tied to the control established for this project.

All field observations, unadjusted traverse computations and final adjusted coordinates must be included in the notes. A list of all horizontal control points must be developed which includes datum, all point designations, descriptions, coordinates, station and offset, and witnesses. This list must be printed on 8.5" x 11" sheets and placed on CD-ROM, in ASCII format per Attachment ASC. All data relating to the horizontal component of the system must be included in the portfolio. **Also, all raw field data files from GPS receivers and or Total Station data collectors must be included on the CD-rom.**

GPS rapid static techniques will be allowed to establish the Intermediate Control Points for this project. A minimum of 20 minute sessions and double occupancy is required per each setup on each point, the data must be post processed, and all data must be submitted at least in electronic

format and be contained in the Control folder on the CD-rom.

RTK GPS techniques will be allowed to do the topographic mapping for this project where permissible otherwise conventional methods will be used. At a minimum when using RTK methods all check shots must compare within 0.05 feet in X, Y, and Z to the established Intermediate Control Point coordinates. **If this tolerance is not met then all the data from the previous Control Point must be re-observed.** The original data set must be retained and submitted and also noted in the Surveyors Report.

VERTICAL

Bench marks need to be set at intervals of approximately 1600 feet and outside the proposed construction and must be accurately described, and referenced by plus and outs from alignment station.

Intermediate Vertical Control for project bench marks shall meet an unadjusted error of closure between known bench marks of not more than **0.06 feet times the square root of the distance between the marks in miles**. Any error of closure must be distributed throughout the level runs by means of a suitable least squares adjustment software program. Open level loops are **NOT** acceptable.

The bench mark notes must include all field observations, the unadjusted loop closures and the final adjusted elevations. A bench mark list must be developed that includes datum, designations, descriptions, elevations, and station and offset (left or right) out from the plan centerline. This bench mark list must be printed on 8.5" x 11" sheets and placed on a CD-Rom, in ASCII format per attachment ASC. The printed list and the CD-ROM are to be submitted with the consultants final report.

The Vertical datum for this project will be NAVD88.

ALIGNMENT

The legal (plan) alignment is required for this project. The following Points of Intersection (PIs) are required to be recovered / perpetuated / set: Station 1098+80.82, 1174+35.78, 1280+98.89, 1282+88.35, 1412+58.10, 1415+70.95, 1465+05.86, 1509+68.16, 1509+97.45, and 1569+60.65 per ROW sheets 65 to 67 for Genesee County and sheets 27 to 33 for Lapeer County. As Built Plans of these 2 Control Sections will be provided on CD-rom along with copies of the ROW Sheets and corner cards of the Section Corners to the selected consultant. A text file per Attachment Ascii must be supplied with all the required data. LCRCs must be filed depicting the Alignment points as Property Controlling Corners. A detailed explanation of how the alignment was established, along with all documentation, is required as part of the surveyors report.

Establishing the plan centerline alignment determines the legal limit of the right-of-way as

defined by and described from its centerline. Right-of-way plans, previous construction plans, existing monumentation, physical evidence, and other recorded information are to be used as guides to the **proper location of the legal centerline**. All evidence must be evaluated to determine the plan alignment. The method used to establish this alignment **must be clearly explained** in the surveyor's project report. All data used to determine the plan centerline alignment, as well as a sketch of the alignment, must be included in the submitted survey notes. This alignment, with the stationing marked and labeled, is to be shown on the topographic map submitted for this project. All as-built centerline deflection angles, distances, and curve data must also be reported for this section of roadway, where as-built centerline differs from legal centerline.

The project surveyor must provide a sufficient number of primary and intermediate control points to allow staking of the computed alignment without additional traversing by construction survey crews. The alignment notes must include the coordinates and at least four witnesses for each alignment control point set or found.

The consultant must include a sketch of the alignment in the portfolio, showing stationing, horizontal coordinates, curve data (Radius, External, Tangent length, PC station, PI station and PT station), alignment points found or set, and a station equation to existing stationing in feet.

PROPERTY

The deeds which cover MDOT ownership for this project will be supplied to the selected Survey Consultant.

The property section is comprised of all government corner and property information required for this project. This includes all pertinent recorded land corner recordation certificates, recorded plats (subdivisions and condominiums), tax maps, tax descriptions, recorded and unrecorded surveys, and ties to the project coordinate system for all found or set monuments. This information will be used, in part, to identify the ownership of the abutting property which may be affected by this project and to prepare the legal descriptions for any property and/or easements which MDOT may need to obtain.

GOVERNMENT CORNERS

The following PLSS corners are within the Highway ROW and need to be perpetuated or re-established with a recorded LCRC submitted.

All PLSS corners located in hard surface roads must be protected by a monument box, regardless of any impending construction.

Township 7 North Range 8 East : G-6, I-6, J-6

Township 7 North Range 9 East : F-6, H-5, I-5, M-5

Township 7 North Range 10 East : A-5

Any PLSS corners, including property controlling corners, within the project construction limits must be recovered or established and tied to the project coordinate system. Any PLSS corners that are needed to establish the alignment are required. The consultant is specifically responsible for the recordation of a land corner recordation certificate (LCRC) to perpetuate the evidence at any and all monument boxes located in the project area. A recorded copy of a recent LCRC may suffice, as long as four valid witnesses remain.

All PLSS corners must be recorded in accordance with PA 74 of 1970, as amended, and all applicable administrative rules. A copy of each **recorded** land corner recordation certificate must be submitted to the MDOT Design Survey Office as part of the final report.

MAPPING

Mapping for this project will commence 500 feet west of the east end of MDOT Road Survey Project 60478 C / Photogrammetry Project 850 for overlap / merging purposes and end at the west side of the Morris Road Overpass. Mapping will be from ROW to ROW as this stretch of I-69 will be Reconstructed, to include the full interchanges at Elba Road, Lake Nepessing Road, and M-24. **All necessary electronic files will be supplied to the selected Survey Consultant to be able to cut and merge the M-15 / I-69 interchange to this project.** Cross sections will be taken at no more than 100 feet apart and in the following manner- Hard surface observations (LL, EC, EB) will be collected. Back of curb (BC) and gutter pan (GUT) will be collected in areas where curb exists. Edge of concrete observations are to be staggered at half the distance between the edge of bit shoulder observations to create a stronger Triangulated Irregular Network (TIN). For instance, at Station 1080+00 in a 2-lane section, observations will be made at the left and right EB. At Station 1080+50, observations will be made at the right EG, CL and left EG. At Station 1081+00, observations will again be at the left and right EB. As I-69 is a divided highway staggering the points to cover the median and ditches to the ROW will be accomplished in the same fashion as noted above.

The Consultant must also submit files created from Caice that are formatted for design in Geopak software. This can be accomplished by using the MDOT Plans Production Caice Tugboat. The Consultant must submit a 3D Microstation Triangle file, a survey chain (tin boundary) around the edited Triangle file with the name and feature of CLIP, a JOB#.obs file, and a JOB#.xyz file.

All Guardrail must be located and tied in with a Station and offset report generated.

The random topo shots and points along break lines should be taken at approximately 25 foot intervals within the defined mapping limits.

All curb, gutter, cross-culverts, headwalls, and public or private hard surface approaches within the mapping limits of this project must be accurately described and located. New curb and gutter sections shall be noted as such.

All drainage structures within the defined project limits will be located and identified - a report

is required which shall depict whether structure is mainline or driveway, location by station and offset, size, material, and end treatment or not.

ELEVATIONS

All features / elevations that might affect the design of this project must be shown on a comprehensive plot prepared from field survey measurements. The sight distance between observations should not exceed 660 feet to obtain any elevation data, especially for hard surface elevations. Elevations of the ground surfaces should be recorded to the nearest 0.01 foot. The standard error for ground elevations must be no greater than 0.05 feet. All hard surfaced roads, curbs, sidewalks and water surface elevations must be recorded to the nearest 0.01 feet. The standard error for these elevations must be no more than 0.02 feet. This standard can be met by differential leveling or by total station trigonometric survey. The instrument height and target height must be measured and recorded to the nearest 0.01 foot and sights must be taken to targets on prisms.

When mapping field work, the horizontal and vertical control for the project must be checked into as random shots to the recorded designations. The difference between mapping checked coordinates and previously adjusted coordinates must not exceed 0.05 feet in x, y or z.

This section of the portfolio will contain sections for all topography, elevations, surface / subsurface utility locations, and surface / subsurface drainage, including any and all cross culverts.

A statement, similar to the following, must be affixed to each sheet of all plots which certifies to the maps accuracy and signed and sealed by the project surveyor:

I hereby certify that this map has been developed from survey data collected, and that the accuracy standards are in accordance with the MDOT Design Survey Standards. This map correctly represents the existing conditions at the time the survey was completed.

All plots must be clearly defined and legible. An illegible plot will not be acceptable.

UTILITIES

All surface manifestations of utilities within the project area must be identified and their location tied to the projects coordinate system. A list of all utilities within the project limits must be submitted on a CD-ROM as well as on a printed list. This list must include the feature name of each utility, its horizontal coordinates, its elevation, the closest station, and the perpendicular distance from the specified station to each utility feature. A station and offset report will satisfy this requirement. **Each report per feature code shall be a separate document.**

The consultant must submit for each utility in the project area a list with the name of utility, address, phone number, and a contact person.

DRAINAGE

The consulting firm is required to contact all local officials necessary to obtain all surface and subsurface drainage information regarding the project. The consultant must also ask the local officials about any known drainage problems within the project area, and report their findings as well as any observed drainage problems.

For this project all visible drainage structures are required to be tied to the project coordinate system. Station and offset reports per each feature generated from Caice will suffice.

The following information is required for all surface and subsurface drainage:

- The location of all catch basins, manholes, sewers and cross culverts must be shown on the topographic map. It may be necessary to prepare a separate plot to clearly show the surface / subsurface drainage systems. **Connectivity is required.**

All plans and maps obtained from local officials are to be submitted as part of the final report. Information regarding any drainage problems from local officials or the consultant's observations must be documented in a separate drainage report.

MISCELLANEOUS

Any information that would not be appropriately placed in the administration, control, alignment, property or mapping sections must be included in this section. General photographs and local newspaper articles are examples of miscellaneous data.

The surveyor must describe, in the final report, the data included in this section.

FINAL REPORT

The final report for this project shall include the following:

1. In the first pocket of the first portfolio, MDOTs Form 222(5/01) entitled SURVEY NOTES: RECEIPT AND TRANSMITTAL, Table of Contents, Authorization Letter, Survey Scope, QA/QC Check List, and the projects Professional Surveyor's Report on company letterhead consisting of the following:
 - a. A comprehensive synopsis of the work performed on this project, signed by the project=s Professional Surveyor.
 - b. The source and the methods used to establish the project horizontal coordinates, elevations, and the alignment(s) for this project.

- c. A detailed explanation of anything discovered during the survey of this project that may create a problem for the designer or another surveyor.
2. Least squares adjustments for the horizontal and vertical control.
3. Text files in ASCII format per Attachment ASC, hard copy, and CD-ROM, which contain the witness lists for the horizontal alignment ties, horizontal control points, bench marks, and government corners, **and placed in a Microstation DGN file.**
4. A sketch of the alignment with stationing, horizontal coordinates, curve data, alignment points found or set, and a station equation to existing stationing in feet.
5. Control sketch with control points, government corners and alignment plotted. (This may be combined with #4).
6. Tax maps and descriptions, with owner name, address and phone numbers **are not required.**
7. A drawing file (Project #CPL.dgn) with contours. The format for the drawing file shall conform to all MDOT drafting standards pertaining to features display, level assignments, standard line weights and colors, standard text assignments, standard fonts, and MDOT cell library assignments as listed in **Attachments AA, C, D.** Use of MDOTs Tugboat will satisfy.
8. A legible planimetric paper plot, including contours, of this project on the required sheet size and utilizing the most recent MDOT Design Division Feature Codes and Cell Library. Please refer to Attachment AA for Feature Code display criteria. The centerline alignment must be shown on this plot.
9. The consultant is responsible for verifying all plots by a field inspection. Each plotted sheet must have the statement specified in the Standards of Practice for MDOT Design Surveys dated April 1, 1998 affixed to it. Each sheet must also be signed and sealed by a resident Professional Surveyor licensed in the State of Michigan which certifies to the accuracy of the plots.
10. All field survey notes, all electronic data, and all research records obtained for this project shall be contained on the project CD. It is not necessary to submit raw survey data in hard copy form.
11. All supporting and supplemental information/data **shall be scanned and placed on the CD.**
12. Legible **recorded** copies of all land corner recordation certificates (LCRCs) filed for the government corners specified in this scope of survey, used for computation of alignment, or in danger of obliteration by impending road construction.

13. Drainage structure inventory in a spread sheet format.
14. An ASCII list of the name of each utility feature, its horizontal coordinates, its elevation, the closest station, and the perpendicular distance from the specified station.
15. Legible copies of the plans for all utilities located within the limits of this project, and an ASCII list of all utilities with installations in the project area noting utility name, address, phone number and contact person.
16. It is the responsibility of the consultant to insure that all electronic files submitted to MDOT conform to the required format, and that all documents are legible.
17. The consultant must organize and label the various sections of the portfolio as required by the Standards of Practice for MDOT Design Surveys dated April 1, 1998.
18. **The Consultant must also submit files created from Caice that are formatted for design in Geopak software. This can be accomplished by using the MDOT Plans Production Caice Tugboat. The Consultant must submit a 3D Microstation Triangle file, a survey chain (tin boundary) around the edited Triangle file with the name and feature of CLIP, a JOB#.obs file, and a JOB#.xyz file.**
19. MDOT QA/QC Checklist in the Administrative pocket of the portfolio filled out with any NAs explained on the Omission page.
20. **All data, whether electronic or paper must be recorded on non-rewritable Compact Discs (CDs). All paper pages / files, including MicroStation files, contained in the portfolio are required to be scanned and / or converted to Adobe Acrobat PDF (portable document format) format and placed in the appropriate subdirectory on the CD. The Table of Contents (PDF format) will have all PDF pages for the project book marked / linked so that each section or page on the CD can be accessed with a single computer mouse click. All original specified electronic files, such as ASCII text, Caice, Microstation DGN, etc. must be accessible in their original format. All photos must be in JPEG format.**

ATTACHMENT ASC

Mandatory ASCII format for control point, alignment point, government corner, and benchmark witness list.

1. File must be generated exclusively in ASCII Text format, in a program such as Notepad. Conversions from Rich Text Format, WordPerfect, etc. are not acceptable unless the file can be imported directly into Microstation in proper format.
2. **Do not use Tabs** to align text. Use spaces only.
3. Use normal keyboard keys for fractions. (Ex: ½")
4. For special characters use only the following MDOT Design font zero keyboard keys.
5. Data must be organized as shown in the example below:

FONT O KEY BOARD CHANGES

< = ± (PLUS OR MINUS)
 \ = C_L (CENTERLINE)
 } = Δ (DELTA)
 ! = ø (DIAMETER)
 ^ = ° (DEGREE)

CONTROL PT#: CP660

DESCRIPTION: Set 5/8" x 3" rod and yellow S&W cap in west edge of M-95 gravel shoulder, and < 150' north of \ of Norway Dr.

Station 47+38.27, Offset 24.00' Lt

COORDINATES: N = 409,047.6476 E = 13,232,571.566 Elev = 892.864

Combined Scale Factor: 0.99996741

WITNESSES:

1. EAST 16.45' \ of N-S concrete M-95.
2. SOUTH 6.05' North edge of concrete base of "Sagola City Limits" sign.
3. S84^W 16.66' Set nail and S&W tag in north face of power pole.
4. S43^E 73.82' Set nail and S&W tag in S.W. face of 6" ! maple.
6. Data must be capable of being imported directly into Microstation, while retaining basic structure and showing proper symbols such as degree and centerline.
7. Prior to importing text files into Microstation, the font must be set to 0, Height must be set to 12, Width must be set to 10, and Line Spacing must be set 8 in the Microstation-Element-Text Dialog Box. Also, in the same Dialog Box, single line and multi-line justification must be set to Left.
8. A Microstation file must be saved and submitted with the appropriate control point, benchmark and witness data. This file must be named Job#wit.dgn.

Attachment E

MDOT QA/QC Certification Check List

(May 2004)

The purpose of this checklist is to insure that critical items are checked prior to submitting the project for review and acceptance. The proper use of this document should drastically reduce the amount of time spent by

MDOT and Consultant personnel correcting oversights and omissions from the project. The last page of this list is to be used to provide a brief explanation of why an item is being omitted. If a particular item is not applicable simply check NA, no explanation is necessary. **Failure to complete and include this list with the final project portfolio will result in the immediate return of the portfolio for completion.**

**NOTE : Be sure that the latest CAiCE files and Tugboat from the MDOT FTP site are utilized.
Be sure that the latest PDF requirement is accomplished.**

√ NA

Portfolio:

_____ _____ Two complete sets of survey data have been compiled for delivery.
_____ _____ Portfolio labeled as per Scope.

Portfolio Pocket Contents:

Administrative:

_____ _____ **The MDOT Survey Contact is _____.**

_____ _____ MDOT Transmittal Form 222

_____ _____ Table of Contents matching the portfolio contents

_____ _____ MDOT QA/QC Certification Check List

_____ _____ All portfolio pages have been scanned into PDF format

_____ _____ Comprehensive project survey report in Microsoft Word. Also, include a synopsis of the report that pertains to that section in the front of each pocket in the portfolio.

_____ _____ MDOT Authorization Letter

_____ _____ Copy of Project Scope of Work

_____ _____ Copy of Proposed Work Plan and Schedule

_____ _____ Copy of all Work Permits required for the project

_____ _____ All correspondence including all E-mails
(change of scope, change of schedule, phone records etc.)

_____ _____ **All Project and PDF files must be archived in subdirectories matching each portfolio pocket on the Compact Disc (CD) including: CAiCE archive (.zip), Microstation drawing file (.DGN) which must also be in their original format.**

_____ _____ All required ASCII files and Microsoft Word documents.

√ NA

_____ _____ All Project files and CAICE archive recorded on a Compact Disc (CD) named the same as the job number (#####c) and all files under the appropriate directory

headings:

ADMINISTRATION __, CONTROL __, ALIGNMENT __, PROPERTY __,
MAPPING __, MISCELLANEOUS __.

Control:

- ____ ____ Control Point List in Microsoft Word and ASCII text formats with:
 Datum __, Description __, Coordinates with Std. Err. __, Station-offsets __,
 Scale Factors __, Witnesses __, Geoid used __, Grid __ or Ground __
 Plane.
- ____ ____ Statement with formula to convert from Grid to Ground on Control Point list.
- ____ ____ Bench Mark List in Microsoft Word and ASCII text formats with:
 Datum __, Descriptions __, Elevations __, Station-offsets __.
- ____ ____ Control Point least squares adjustment statistical report (ASCII) showing
 Reference Factors and weighting strategies
- ____ ____ Benchmark level loop - least squares adjustment report (ASCII)
All level loops should be in one adjustment run if at all possible.
- ____ ____ G.P.S./traverse adjusted coordinates with standard errors
- ____ ____ **Level adjustment report, showing to the hundredth of a foot,**
 ____ **0.06ft error per /Mi**
 ____ **0.04ft error per /Mi**
- ____ ____ Sketch or plot of network or traverse
- ____ ____ NGS or MDOT data sheets of existing control
- ____ ____ DDPROC - .ha files printout, or copy of Mark Recovery Form submitted
on the NGS website for stations recovered and used for Horizontal and / or
Vertical Control

Alignment:

- ____ ____ A sketch or CADD drawing of the alignment with:
 stationing __, horizontal coordinates __, curve data __, alignment points
 found or set __, source of stationing __.
- ____ ____ Control sketch with control points, government corners and alignment plotted.
- ____ ____ A report discussing in detail the type of alignment, source of the stationing and how it
was determined.
- ____ ____ Alignment point list in Microsoft Word and ASCII text formats with:
 Datum __, Description __, Station __, Coords. with Scale Factors __,
 Witnesses __.

√ NA

Describe Alignment Chain(s) (ASCII) from CAiCE

Coordinates __, Bearings __, Distances __, Curve data __, Stationing __.

Property:

Recorded copies of all LCRCs required for the project.

Government Corner list in Microsoft Word and ASCII text formats with:

Datum __, Corner names __, Coordinates, Scale Factors, and 4 witnesses __,
Indication of which corners are in danger of destruction __.

Section Corner ties to the alignment with station, distance and bearing along the section line.

Section map with bearings, distances between Government corners.

Copy of submittals to county Remonumentation (if required)

Copies of all research documents, tax maps, tax descriptions, deeds, recorded plats, surveys, etc.

A separate plot of alignment or tax map showing all property irons found, with point numbers.

Property Corner report (ASCII) with

Coordinates with Scale Factors __, Station-offset __, Description __, Feature code __, Alignment name __.

A station-offset listing of property irons.

Mapping:

*** A legible planimetric plot (2d Microstation Drawing) generated from the MDOT (CAiCE) Plans Production Tugboat, including:**

Contours __, MDOT Cells symbology __, Centerline alignment shown __.

A second plot showing all surface materials, utility connectivity and other pertinent notes or comments.

All plots certified as per scope.

All field survey notes obtained for this project.

Drainage structure inventory is:

correlated to the structures shown on the plot __, includes all pertinent data about the structures: Station and offset __, coordinates __, structure name __,

rim elevations __, invert depths with corresponding computed invert elevation __, pipe sizes __, directions __, structure cover type __, culvert size, material, condition __, headwall or end section description __.

√ NA

____ ____ INDIVIDUAL UTILITY REPORTS (ASCII) for each utility with:
Designation __, Coordinates __, Elevation __, Description __, Feature Code __, Station-Offset __.

____ ____ Utility Owner listing (ASCII) with:
Name of Utility __, Address __, Phone number __, Contact Person __.

____ ____ Drainage structure report (ASCII or a spreadsheet compatible with MDOT software) of manholes and catch basins with:
Designation __, Coordinates __, Elevation __, Description __, Feature Code __, Station- offset __, Invert and Pipe Dimension information __, Structure condition __.

____ ____ Culvert Structure report (spreadsheet compatible with MDOT software) with:
Designation __, Coordinates __, Elevation __, Station-offset __, Size and Material __.

____ ____ Drainage Report (dissertation of conversations with local people and own visual inspection of the project area.

____ ____ A list of all utilities noting utility name, address, phone number and contact person.

____ ____ Station Offset report for each utility feature.

____ ____ As-Built plans from each utility.

Miscellaneous:

____ ____ Miscellaneous Information Included

____ ____ Digital or Scanned Photographs

Bridge Specific Information:

____ ____ Sketch of structure* in elevation view including:
Ref. Line to Ref. Line Dimensions __, Ref. Pt. Elevs. __, Ref Pt. Stations __, Underclearance Elev. __, Abutment, bridge seat and Pier cap Elev. __, Ftg. Elev. (if requested) __, face to face abutment and pier dimensions __, **top of Water elev. __, stream bed elevs. __, lower roadway elevs. __.**

____ ____ Sketch of structure* in Plan View including:
Ref. Pt. Elevs. __, Ref Pt. Stations __, Ref Pt. Coordinates __, Alignment __, Angle of Crossing __, Deck dimensions __, Abutment and Pier cap dimensions __.

Explanation of how reference point locations were determined.

* If plans are available this information may be shown on existing plan sheets.

√

NA

CAiCE File

Project Name is MDOT Job Number (#####c)

CAiCE Project Description field is filled out

Correct Units (International Feet) selected in System Settings

Correct Datum Selected in System Settings

Z Coordinate value set to 4.2 in System Settings

Correct MDOT Feature Table attached prior to Data importation

Correct MDOT Cell Library attached prior to Data importation

Only MDOT Feature Codes Used

All points have appropriate Descriptions

Desired plot scale checked with designer

All survey chains edited and properly connected prior to DTM creation.

All survey chain crossings resolved.

All survey chain curves checked for correctness and aesthetics.

No survey chain curves are shown as chords.

Survey chain Patterns checked for proper direction (guardrail, railroad, tree line, etc)

Hydro survey chains checked for correct left to right direction.

Single DTM Surface is named EX (multiple surfaces = EX1, EX2, etc.)

DTM checked for invalid break lines

DTM checked for invalid point data (spikes/holes)

DTM triangles checked for spikes and dips

Long or invalid triangles have been obscured from TIN

Bridge decks and data suspended above natural terrain/substructures have been removed from the terrain surface prior to triangulation.

Terrain surface beneath bridge decks is included in DTM

Underwater areas have been removed from terrain surface prior to triangulation

*

Text size is dependent on the scale

____ **100 scale, text size = 9.0**

____ **50 scale, text size = 4.5**

____ **40 scale, text size = 3.6**

*

Cell Scale set to: ____ 1.0 (1":100'), ____ 0.5 (1": 50'), ____ 0.4 (1": 40')

*

Contour Interval set to 2 in DTM Settings

*

Max. Offset for contour smoothing set to 1 in DTM Settings.

Contour Object Display Settings:

*

Contour interval set to 2 regular and 10 index.

*

All contour colors set to 5, Index set to 2

*

Line weights set to 0 regular, 1 Index

*

All contour levels set to 20

*

Index Label spacing set to 60, color set to 5

*

Character height is dependent on the scale;

_____	_____	_____	100 scale, character height = 9.0
_____	_____	_____	50 scale, character height = 4.5
_____	_____	_____	40 scale, character height = 3.6
_____	_____	*	Label Depression Contours unchecked
_____	_____	*	Final contours computed after DTM edits and settings checked

√ NA

Display:

_____	_____	*	Scale and text size checked prior to display
_____	_____	*	Survey Chains displayed as per Attachment >AA=
_____	_____	*	Survey Points displayed as per Attachment >AA=
_____	_____	*	Alignment geometry chain Feature Code is SCL
_____	_____	*	Alignment geometry chain is displayed
_____	_____	*	Contours are displayed
_____	_____	*	Point descriptions displayed as per Attachment >AA= and scope
_____	_____	*	All overlapping text has been clearly resolved (if requested in scope)
_____	_____	*	All subsurface drainage can be correlated with inventory sheets.
_____	_____	*	CAiCE drawing file created and named Job # +pl.cdg (#####cpl.cdg)
_____	_____	*	Correct seed file selected for Microstation file conversion

_____ DATUM	_____ SEED FILE
_____ Assumed	_____ MiDOT2d.dgn
_____ SPC83 South	_____ Seedfs.dgn
_____ SPC83 Central	_____ Seedfc.dgn
_____ SPC83 North	_____ Seedfn.dgn

_____	_____	*	Correct cell file selected for Microstation file conversion (midote_02.cel)
_____	_____		Microstation file of Bridge structures created with Contours (Plan of Site)
_____	_____	*	Geopak files generated from the MDOT Plans Production tugboat/macro.
			_____ 3d Microstation DGN triangle file, _____ Survey Chain (TIN
			Boundary) around edited triangle file with the name and feature "CLIP",
			_____ Job #.OBS and Job #.XYZ files (can only be generated from tugboat)
_____	_____		CAiCE archive file named Job# (#####c.zip)
_____	_____		Project portfolio labeled and includes data as per scope.
_____	_____		Used MDOT's Plans Production tugboat/macro.
		*	Many of the asterisk items can be easily completed in CAiCE using the CAiCE
			Tugboat/Macro AMDOT Plans Production@. Contact your project Consultant
			Coordinator for information about this CAiCE tugboat.

√ NA

_____	_____	All paper pages in the portfolio must be scanned into a PDF format file even if already existing in electronic form. An example will be supplied if requested.
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_____ **Create one .DGN file with the Control point list, Benchmark list, Alignment point list, and Government Corner list per Attachment ASC named the Job # (xxxxxxxWIT.DGN).**

_____ **Scope has been reviewed to insure compliance.**

I have reviewed the survey notes and scope of work and certify that all required and requested information is present in the portfolio in compliance with the MDOT Survey Standards of Practice, the survey scope of work and this QA/QC Check List. Any information omitted from this submission has been explained on the sheet attached.

SEAL

Professional Surveyor #

Explanation of Omissions

[illegible]